CLAIMS

1. A composition comprising a nucleic acid molecule, said nucleic acid molecule comprising:

a cell type-specific promoter for activating the expression of a gene in a specific cell type;

a therapeutic gene sequence operably linked to said cell type-specific promoter;

an amplification promoter element for amplifying transcription of said therapeutic gene in said specific cell type; and

a sequence encoding a transcription activator, said transcription activator for activating said amplification promoter element.

2. The composition of claim 1, wherein said cell type-specific promoter is a tissue-specific promoter.

3. The composition of claim 1 or 2, wherein said cell type specific promoter is a tumor-specific promoter.

4. The composition of claim 1, wherein said amplification promoter element is a stress inducible promoter element.

5. The composition of claim 1, wherein said nucleic acid molecule comprises said sequence encoding said transcription activator.

6. The composition of claim 1, wherein said sequence encoding said transcription activator sequence and said therapeutic gene sequence are on different nucleic acid molecules.

7. The composition of claim 4, wherein said stress inducible promoter element is a heat shock element (HSE).

8. The composition of claim 3, wherein the tumor is a melanoma and the cell type-specific promoter is selectively active in melanoma cells.

9. The composition of claim 1, wherein the cell type specific promoter is human Tyr300 (SEQ ID. NO. 1).

10. The composition of claim 1, wherein the amplification promoter element comprises at least one human HSE consensus sequence.

11. The composition of claim 1, wherein said therapeutic gene is a cytotoxic gene.

12. The composition of claim 11, wherein said cytotoxic gene encodes a fusogenic protein.

13. The composition of claim 11, wherein the cytotoxic gene is GALVenv, HSVTK, cytosine deaminase, nitroreductase, or VSV-G glycoprotein.

14. The composition of claim 1, wherein said nucleic acid molecule kills at least 80% of the cells of the specific cell type, and kills at most 10% of cells which are not of the specific cell type.

15. The composition of claim 1, wherein said nucleic acid molecule produces a level of mRNA expression which is at least 100-fold higher in cells of the specific cell type compared to cells which are not of the specific cell type.

16. The composition of claim 1, wherein said nucleic acid molecule produces a level of therapeutic gene mRNA expression which is at least 500-fold higher in cells of the specific cell type compared to cells which are not of the specific cell type.

17. The composition of claim 1, wherein said nucleic acid molecule produces a level of therapeutic gene mRNA expression which is at least 1000-fold higher in cells of the specific cell type compared to cells which are not of the specific cell type.

18. The composition of claim 1, wherein the amplification promoter element is an HSE and the transcription activator is HSF-1.

19. The composition of claim 1, wherein the transcription activator is activateable by a stressor.

20. The composition of claim 1, wherein said transcription activator is constitutively expressed.

21. The composition of claim 1, wherein said therapeutic gene and said amplification promoter element transcription activator are both operably linked to said cell type-specific promoter.

22. The composition of claim 1 or 21, wherein said therapeutic gene and said transcription activator are both operably linked to said amplification promoter element.

23. The composition of claim 18, wherein the transcription activator which is HSF-1 comprises a deletion of amino acid residues 202-316.

24. The nucleic acid molecule of any of claims 15-17.

25. A nucleic acid molecule comprising a human tyrosinase promoter operably linked to a cytotoxic gene.

26. The nucleic acid molecule of claim 25, wherein said cytotoxic gene encodes a fusogenic protein.

27. A nucleic acid molecule comprising a therapeutic gene operably linked to a cell type specific promoter and a heat shock responsive element, and further encoding a transcription activator for activating said heat shock responsive element.

28. The nucleic acid molecule of claim 27, wherein said transcription activator comprises HSF-1.

29. The nucleic acid molecule of claim 25, wherein the promoter comprises Tyr300 as shown in SEQ ID NO. 1.

30. The nucleic acid molecule of claim 28, wherein said transcription activator which is HSF-1 comprises a deletion of amino acid residues 202-316.

31. The nucleic acid molecule of claim 24, wherein said nucleic acid molecule is any of an adenoviral vector or a retroviral vector.

32. The nucleic acid molecule of claim 31, wherein said retroviral vector comprises a long terminal repeat sequence.

33. A method of treating a patient in need of tissue-selective gene therapy, comprising the step of:

administering to the patient a composition according to any of claims 1-23.